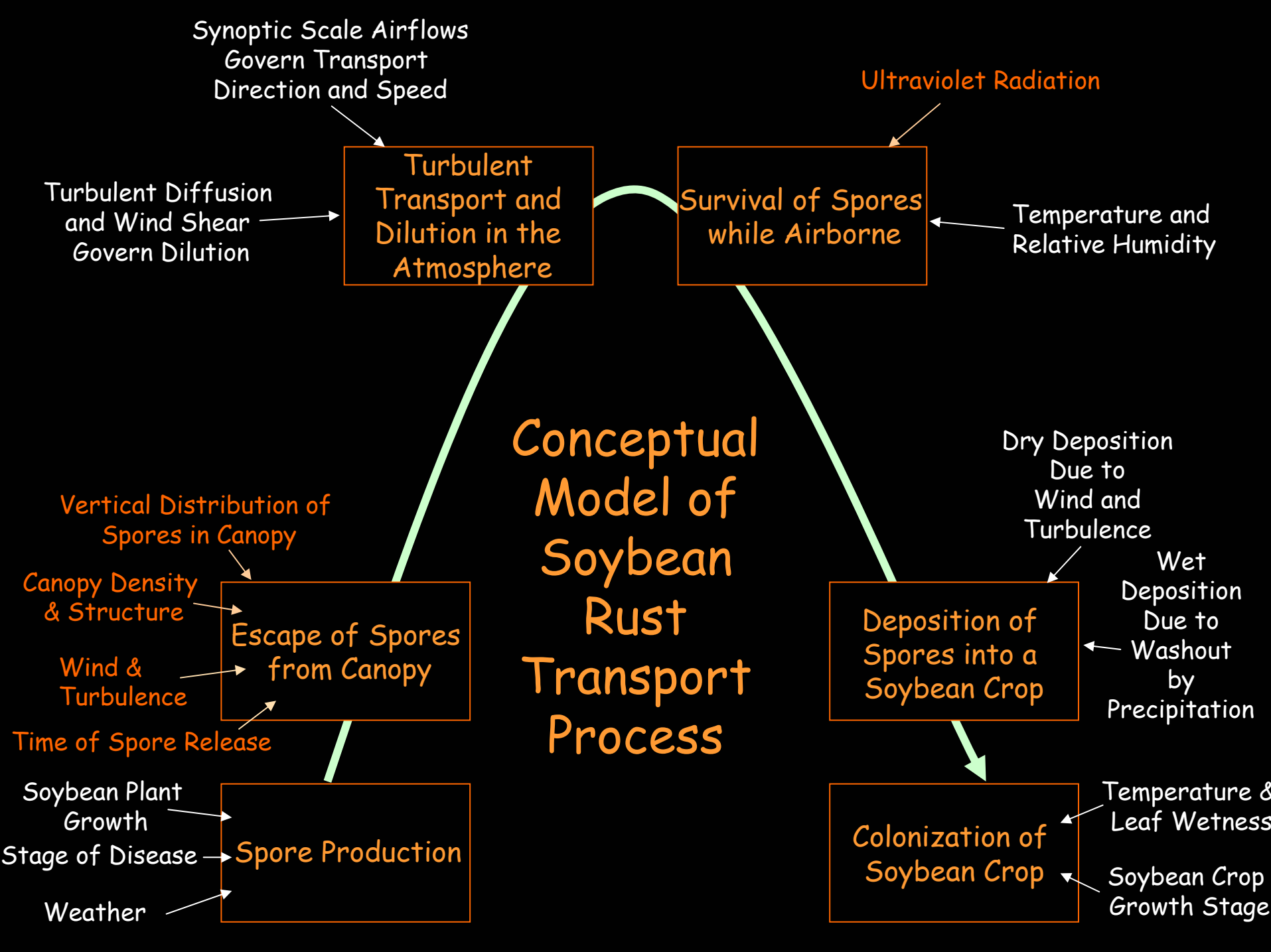
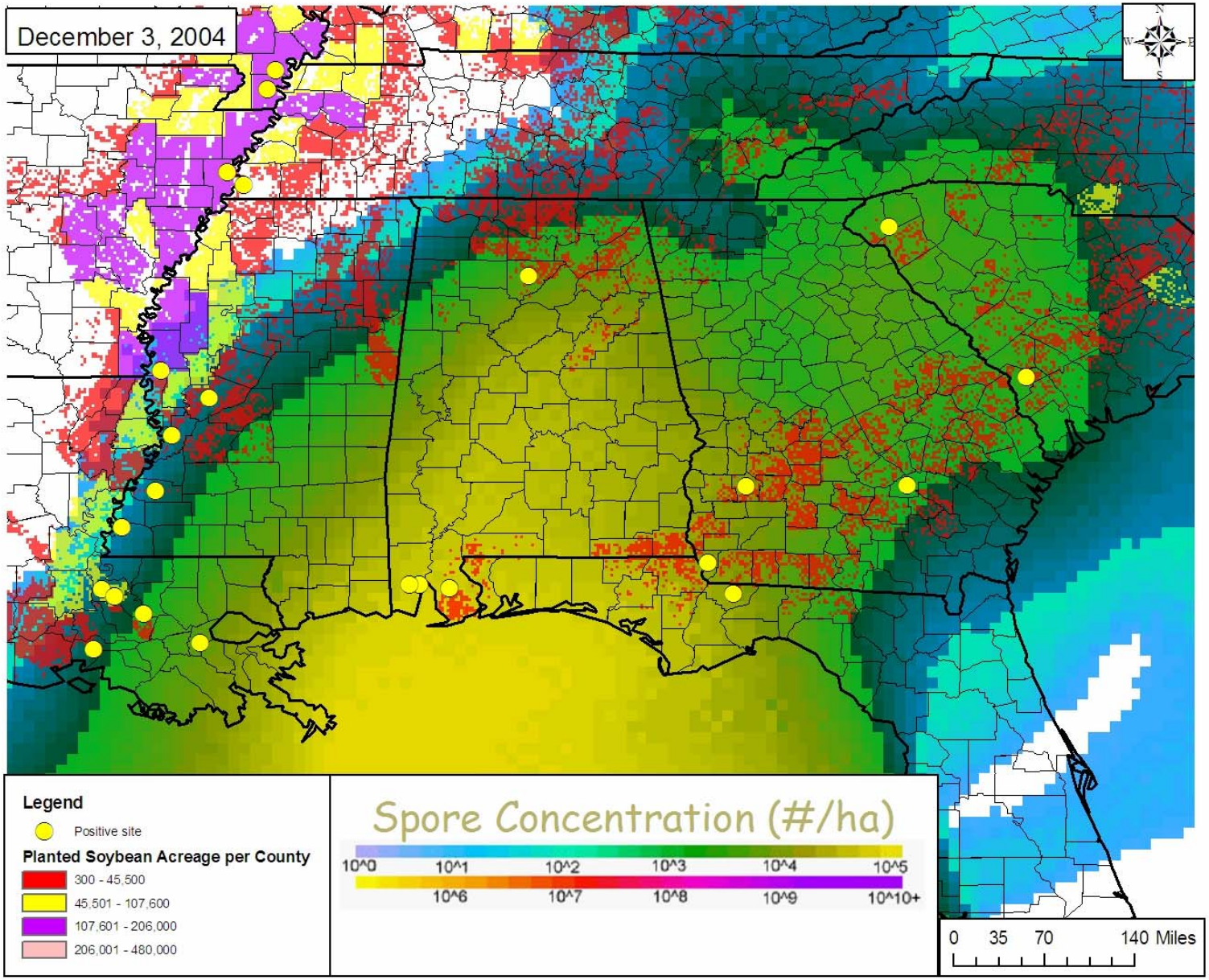
Soybean Rust as a Model

Dan Borchert, USDA-APHIS-PPQ-CHPST
Joe Russo, ZedX, Inc.

Special Thanks to
Scott Isard, Pennsylvania State University
Roger Magarey, North Carolina State University
Glenn Hartman, USDA-ARS
Monte Miles, USDA-ARS

National CAPS Meeting
Nashville, TN
December 7, 2005


Synoptic Scale Airflows Govern Transport Direction and Speed
Ultraviolet Radiation
Turbulent Diffusion and Wind Shear Govern Dilution
Turbulent Transport and Dilution in the Atmosphere
Survival of Spores while Airborne
Temperature and Relative Humidity
Conceptual Model of Soybean Rust Transport Process
Vertical Distribution of Spores in Canopy
Canopy Density & Structure
Escape of Spores from Canopy
Wind & Turbulence
Time of Spore Release
Dry Deposition Due to Wind and Turbulence
Deposition of Spores into a Soybean Crop
Wet Deposition Due to Washout by Precipitation
Soybean Plant Growth
Stage of Disease
Weather
Spore Production
Colonization of Soybean Crop
Temperature & Leaf Wetness
Soybean Crop Growth Stage


December 3, 2004
N
W
E
S
Legend
Positive site
Planted Soybean Acreage per County
300 - 45,500
45,501 - 107,600
107,601 - 206,000
206,001 - 480,000
Spore Concentration (#/ha)
10^0
10^1
10^2
10^3
10^4
10^5
10^6
10^7
10^8
10^9
10^10+
0
35
70
140 Miles

Soybean Rust Activity Flow

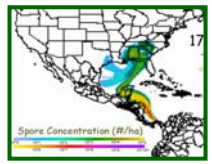
From Planning to Management

Planning

Training

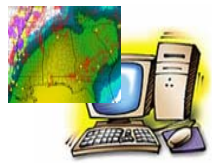
Education

Research



Modeling

Monitoring & Scouting



Information Dissemination

Management

USDA

University

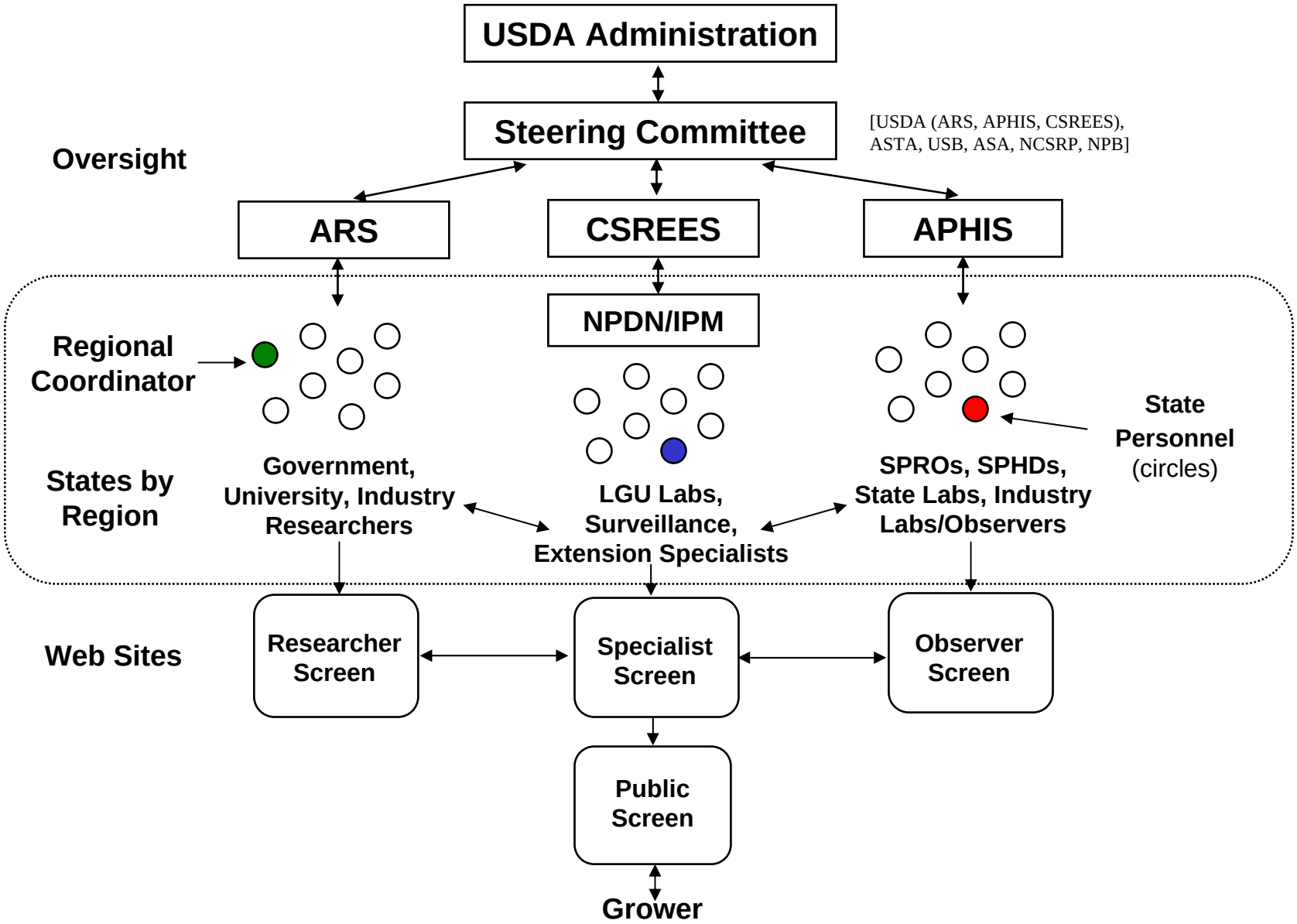
Industry

Grower

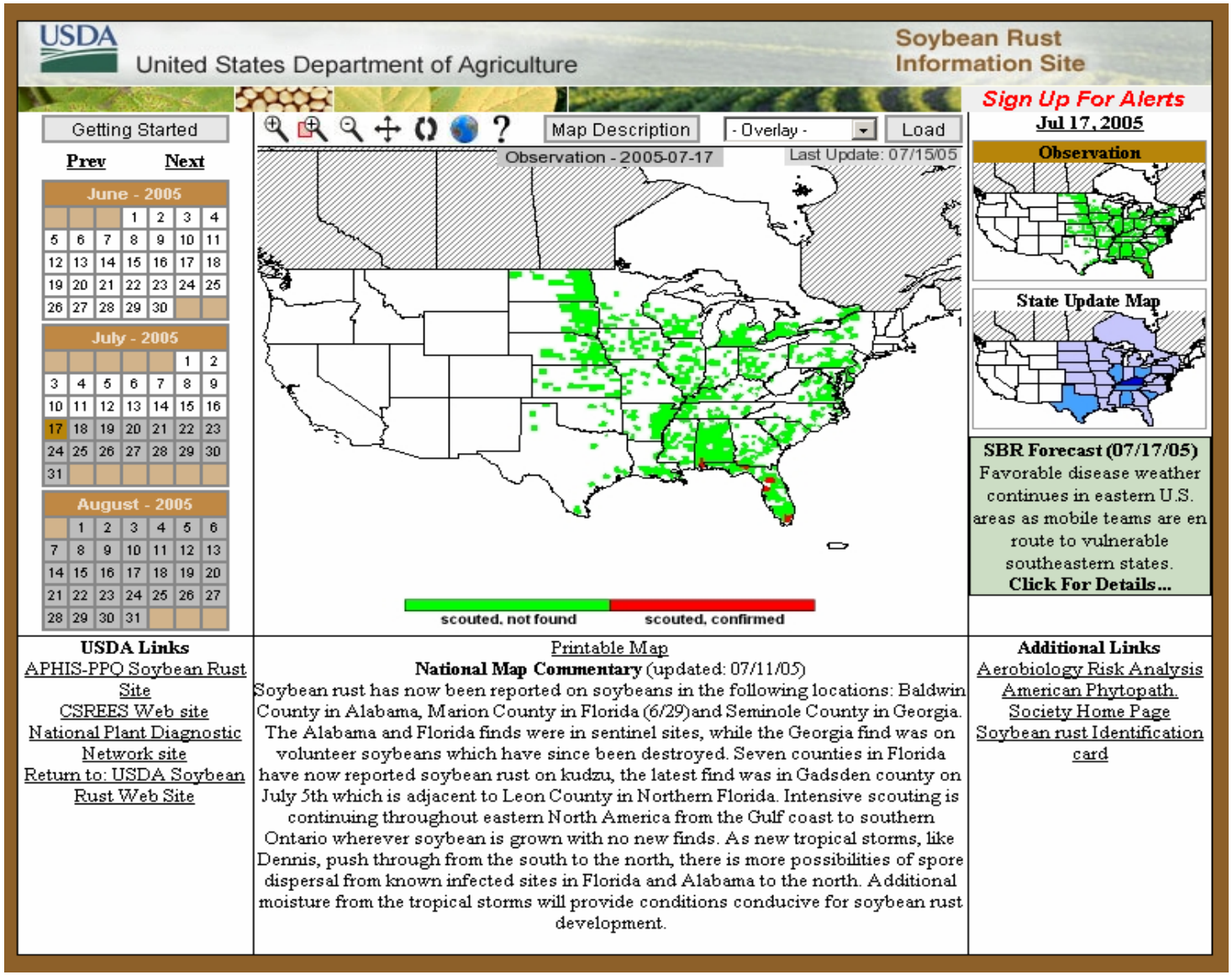
Consultant

Distributor

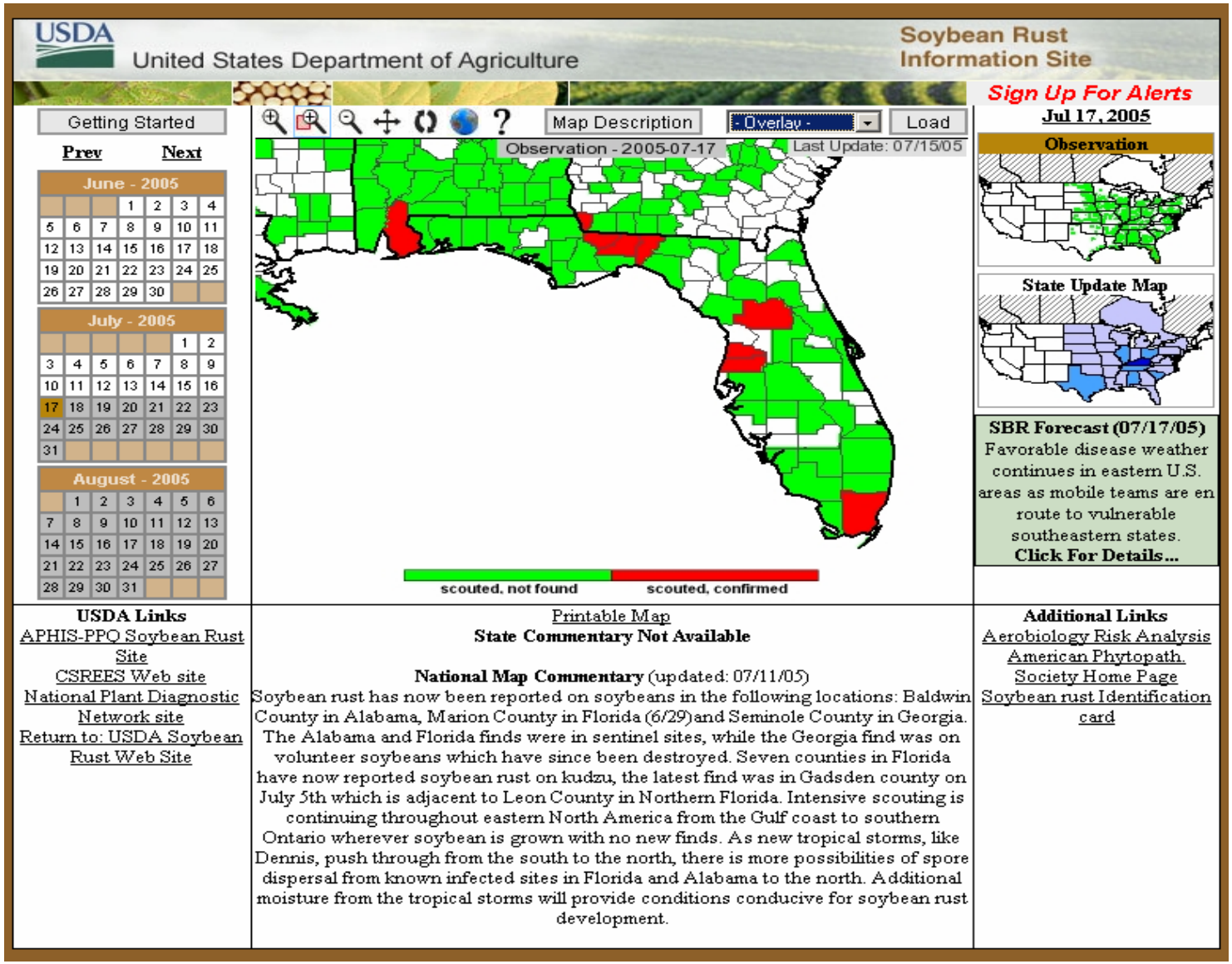
Soybean Rust Personnel Infrastructure



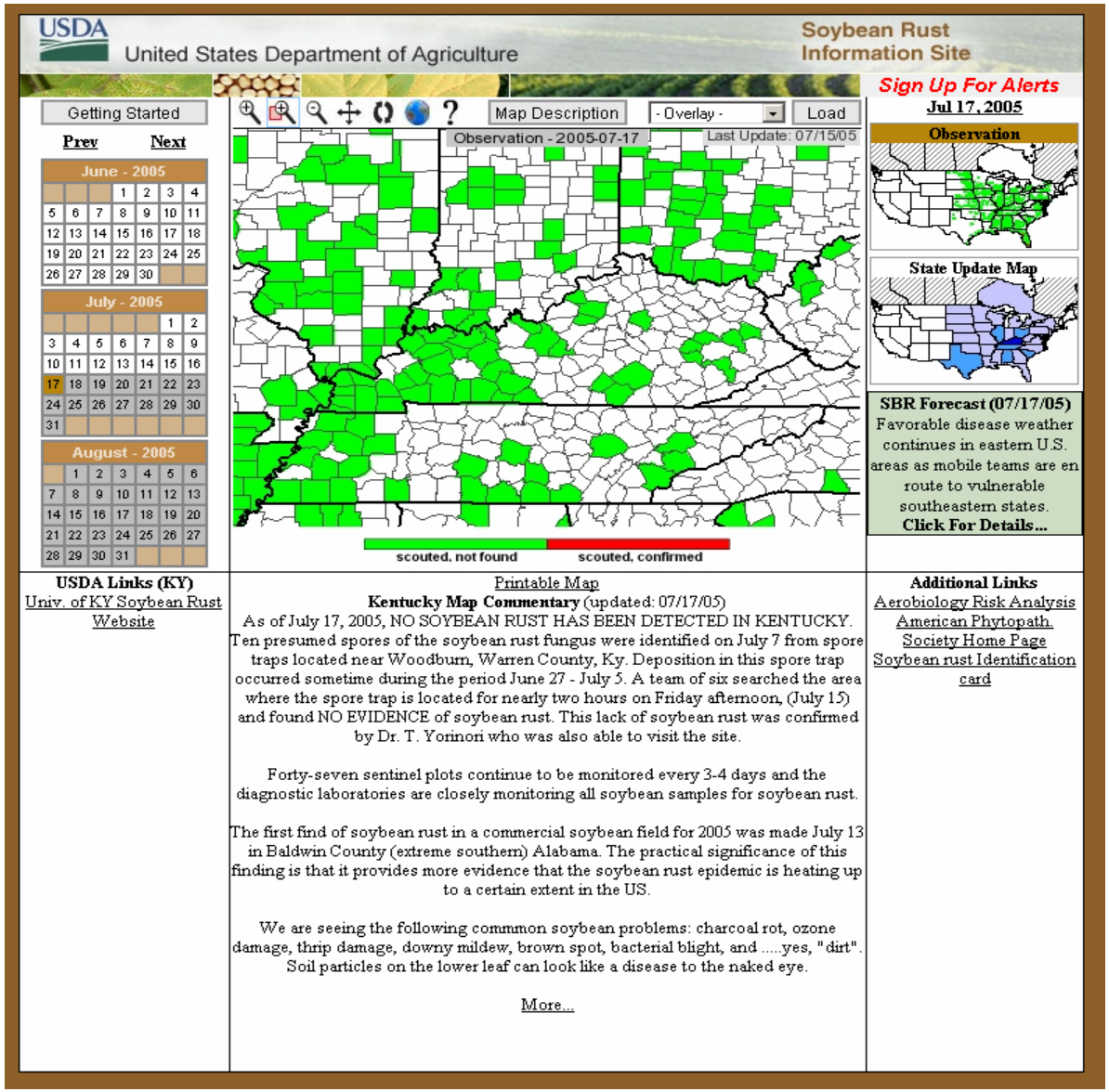
USDA Public Web Site



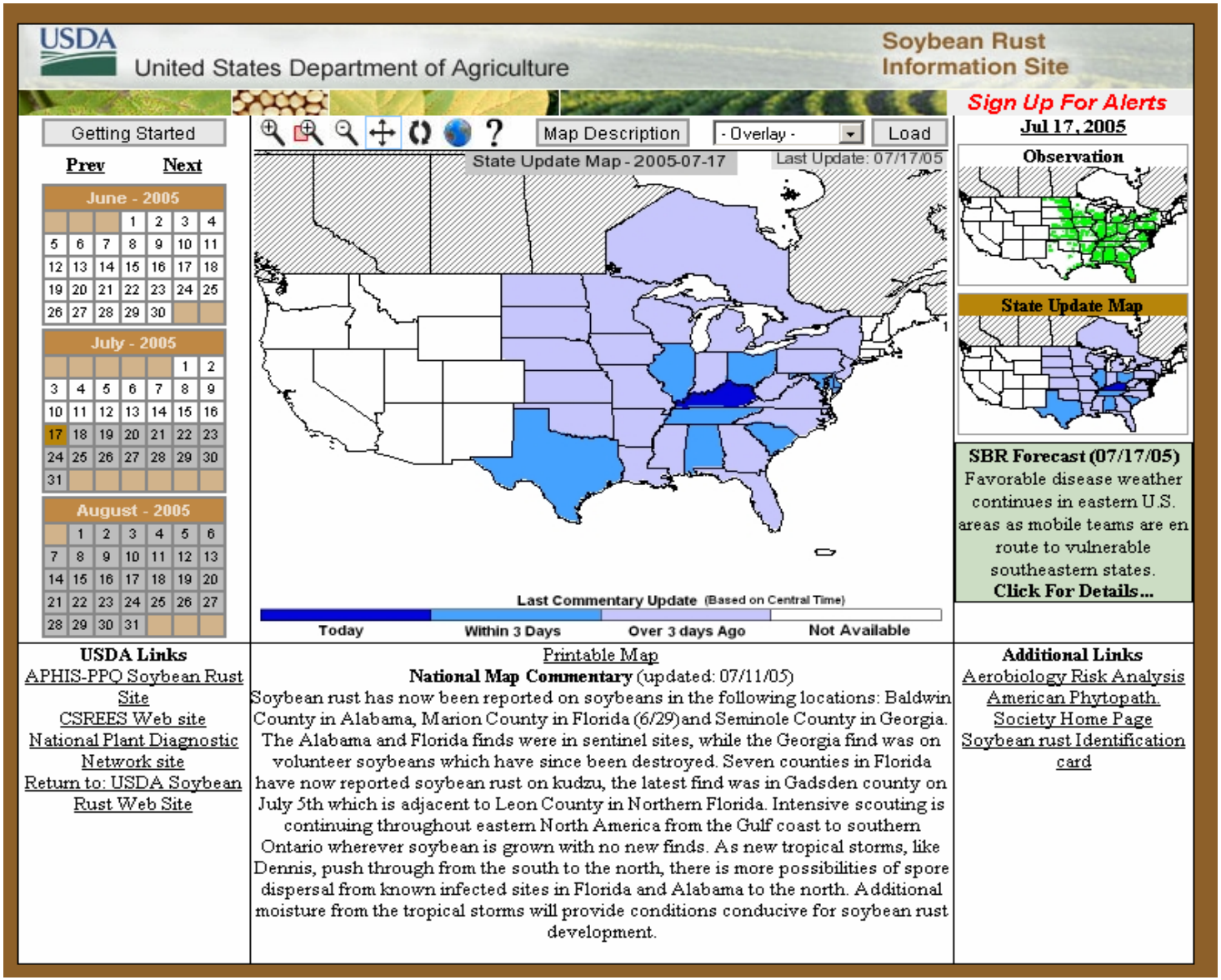
USDA Public Web Site



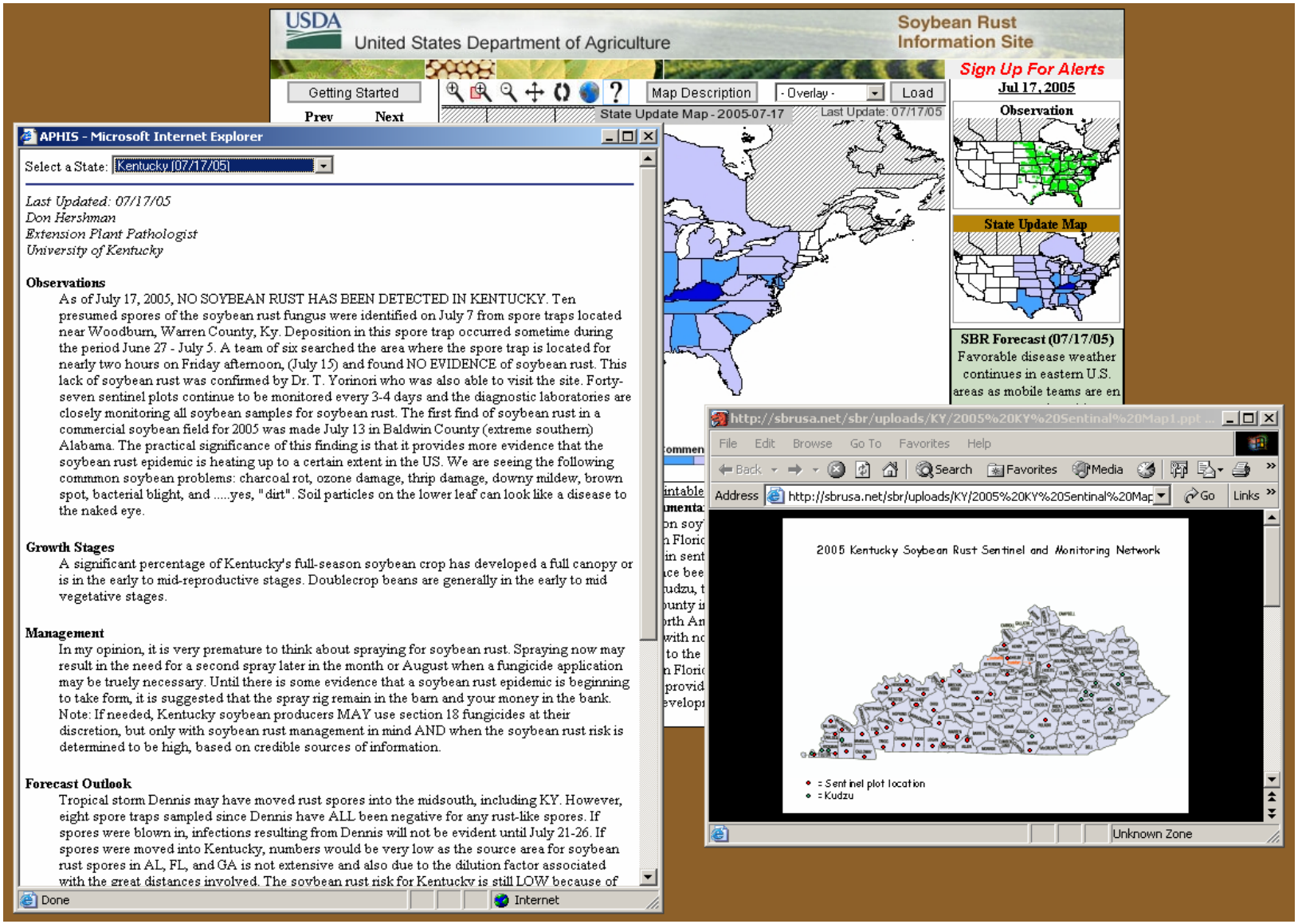
USDA Public Web Site



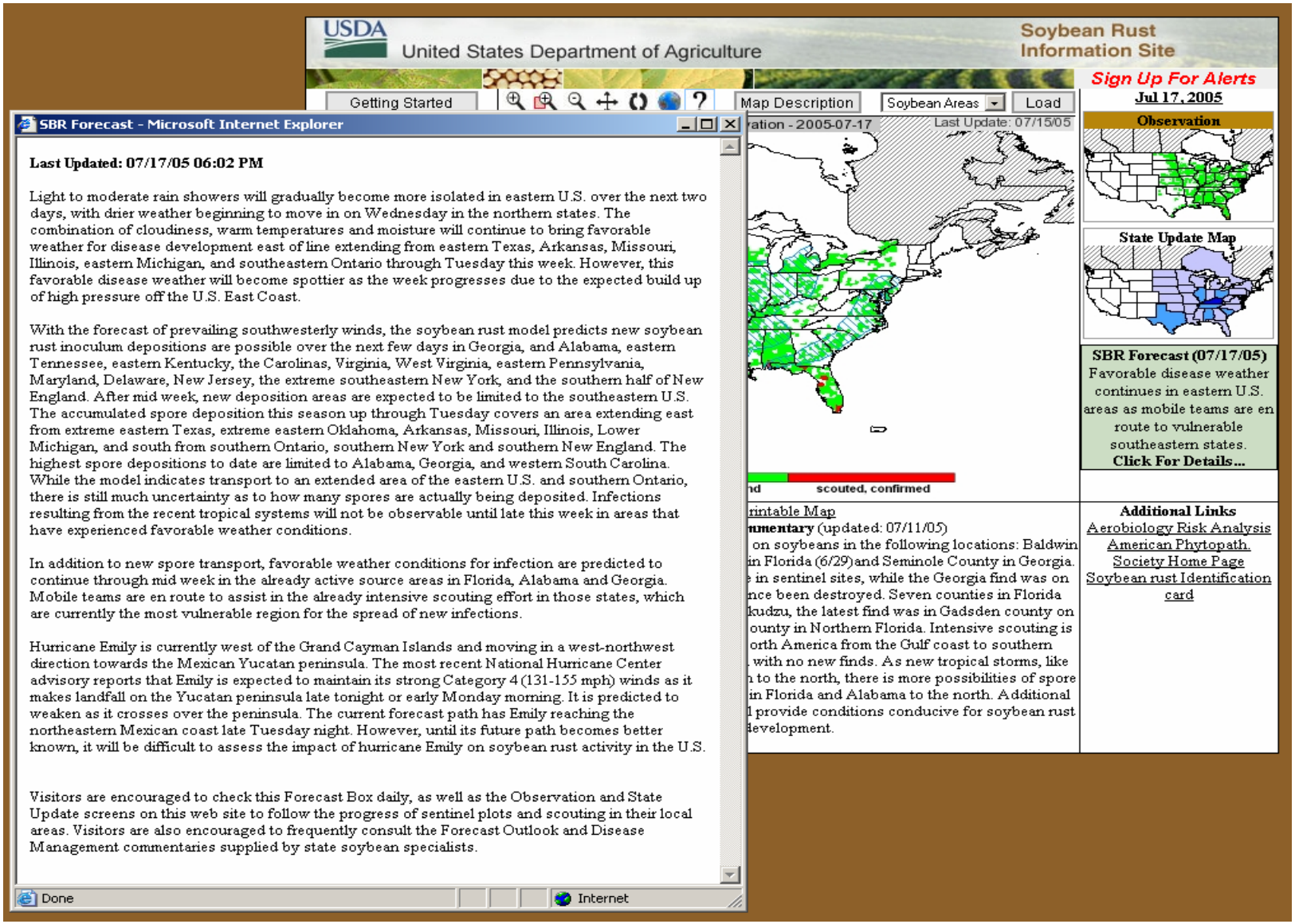
USDA Public Web Site



USDA Public Web Site



USDA Public Web Site



Last Updated: 07/17/05 06:02 PM

Light to moderate rain showers will gradually become more isolated in eastern U.S. over the next two days, with drier weather beginning to move in on Wednesday in the northern states. The combination of cloudiness, warm temperatures and moisture will continue to bring favorable weather for disease development east of line extending from eastern Texas, Arkansas, Missouri, Illinois, eastern Michigan, and southeastern Ontario through Tuesday this week. However, this favorable disease weather will become spottier as the week progresses due to the expected build up of high pressure off the U.S. East Coast.

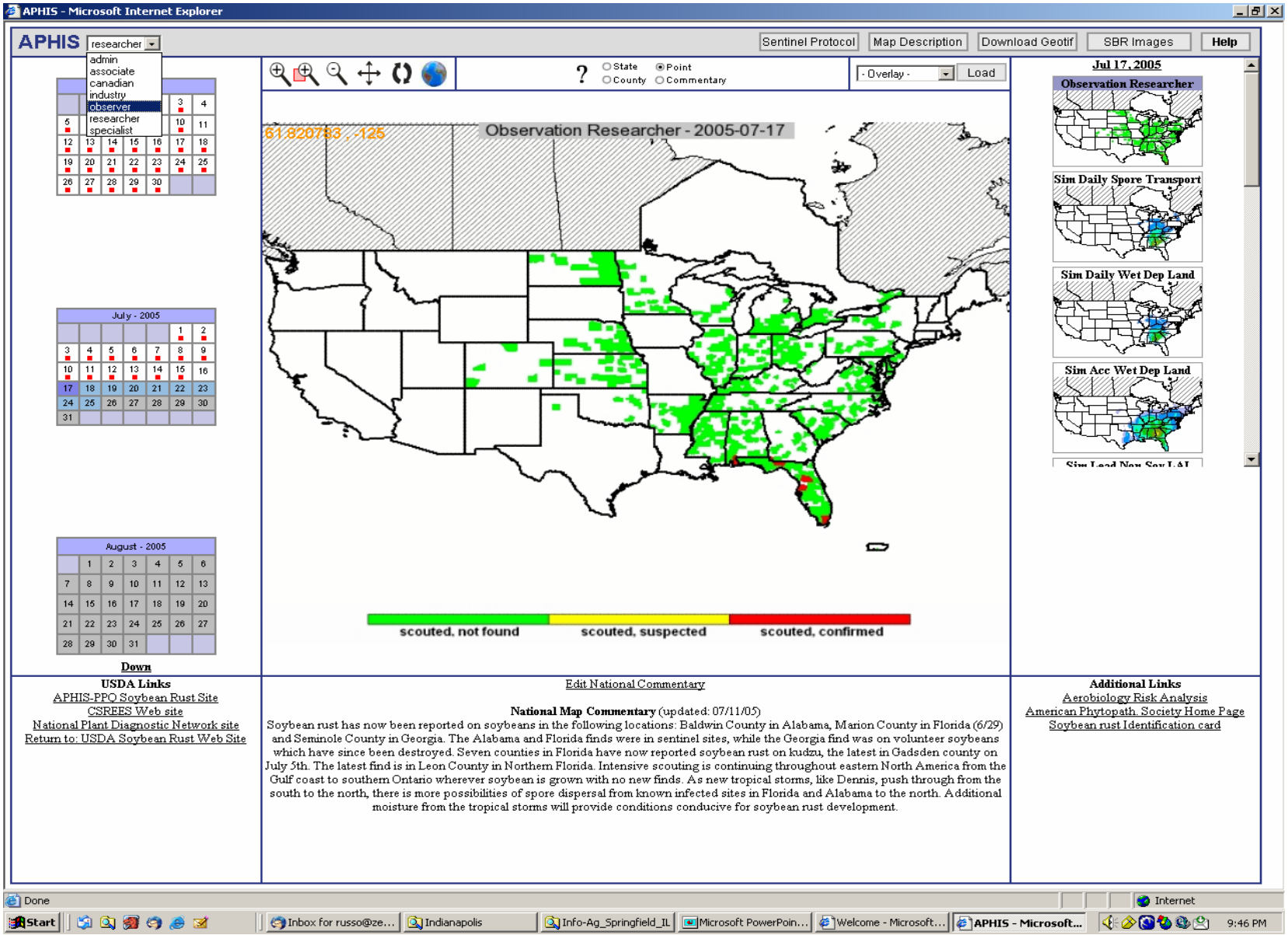
With the forecast of prevailing southwesterly winds, the soybean rust model predicts new soybean rust inoculum depositions are possible over the next few days in Georgia, and Alabama, eastern Tennessee, eastern Kentucky, the Carolinas, Virginia, West Virginia, eastern Pennsylvania, Maryland, Delaware, New Jersey, the extreme southeastern New York, and the southern half of New England. After mid week, new deposition areas are expected to be limited to the southeastern U.S. The accumulated spore deposition this season up through Tuesday covers an area extending east from extreme eastern Texas, extreme eastern Oklahoma, Arkansas, Missouri, Illinois, Lower Michigan, and south from southern Ontario, southern New York and southern New England. The highest spore depositions to date are limited to Alabama, Georgia, and western South Carolina. While the model indicates transport to an extended area of the eastern U.S. and southern Ontario, there is still much uncertainty as to how many spores are actually being deposited. Infections resulting from the recent tropical systems will not be observable until late this week in areas that have experienced favorable weather conditions.

In addition to new spore transport, favorable weather conditions for infection are predicted to continue through mid week in the already active source areas in Florida, Alabama and Georgia. Mobile teams are en route to assist in the already intensive scouting effort in those states, which are currently the most vulnerable region for the spread of new infections.

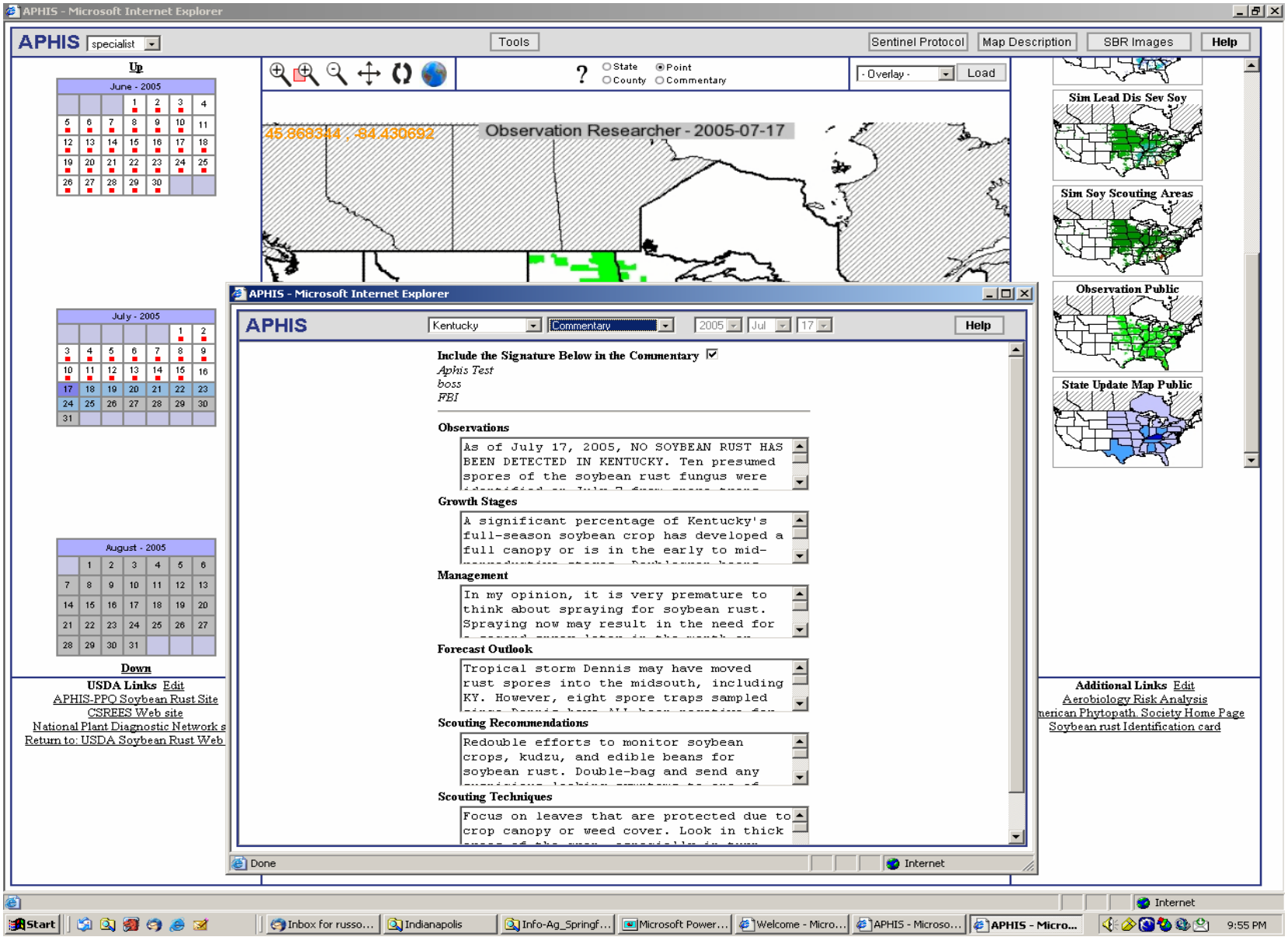
Hurricane Emily is currently west of the Grand Cayman Islands and moving in a west-northwest direction towards the Mexican Yucatan peninsula. The most recent National Hurricane Center advisory reports that Emily is expected to maintain its strong Category 4 (131-155 mph) winds as it makes landfall on the Yucatan peninsula late tonight or early Monday morning. It is predicted to weaken as it crosses over the peninsula. The current forecast path has Emily reaching the northeastern Mexican coast late Tuesday night. However, until its future path becomes better known, it will be difficult to assess the impact of hurricane Emily on soybean rust activity in the U.S.

Visitors are encouraged to check this Forecast Box daily, as well as the Observation and State Update screens on this web site to follow the progress of sentinel plots and scouting in their local areas. Visitors are also encouraged to frequently consult the Forecast Outlook and Disease Management commentaries supplied by state soybean specialists.

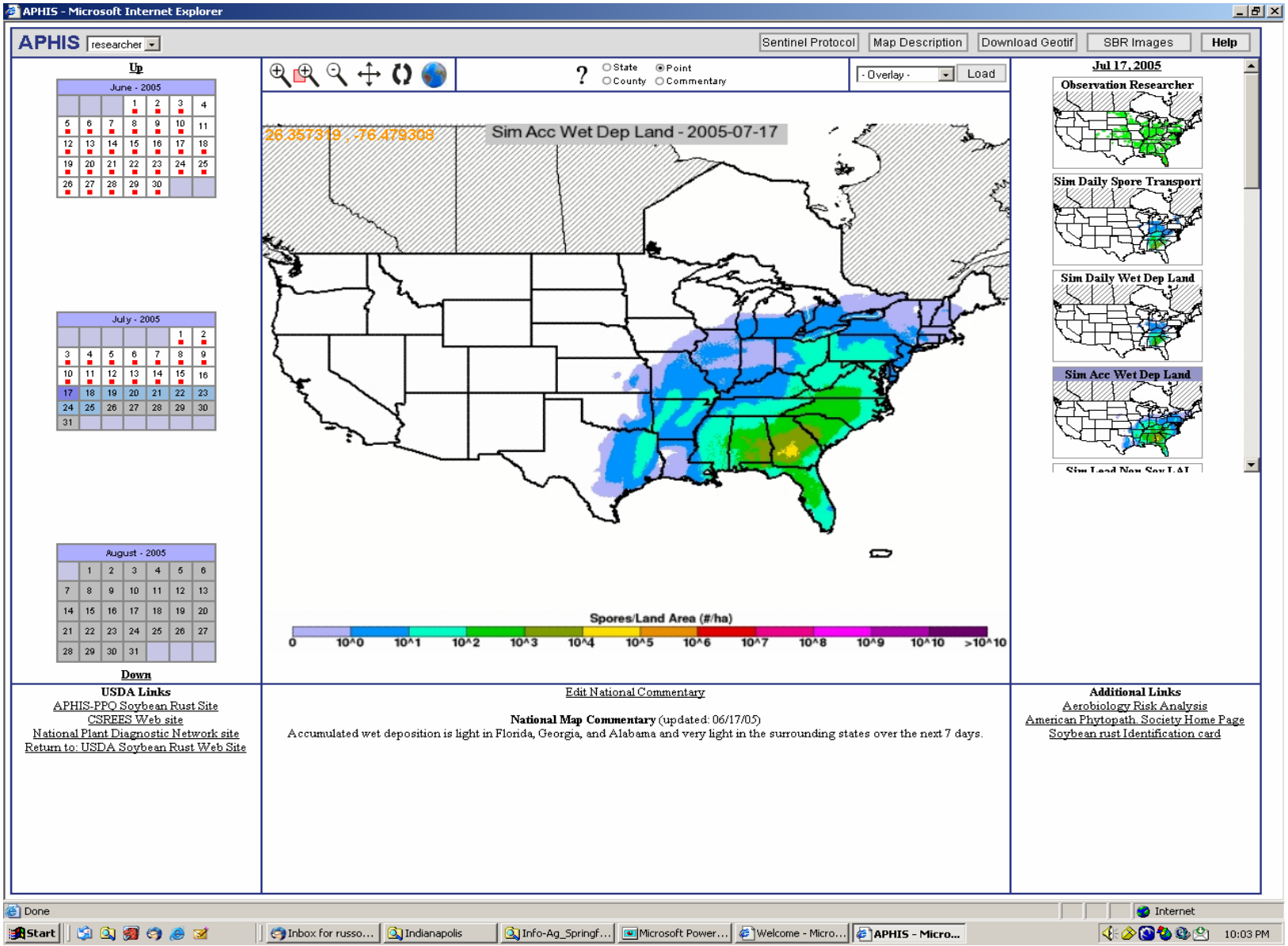
Participant Web Site Views



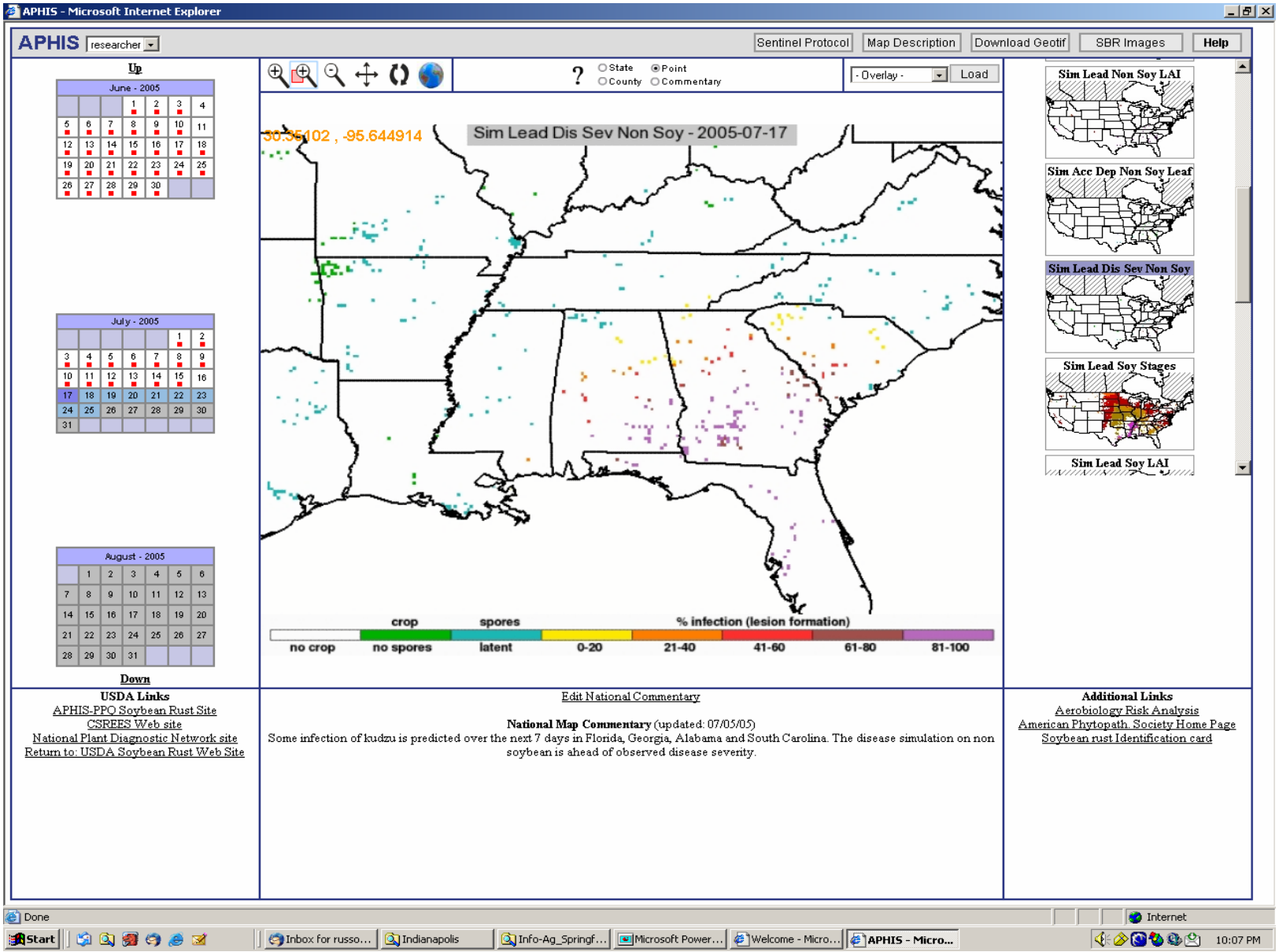
Specialist Web Site View



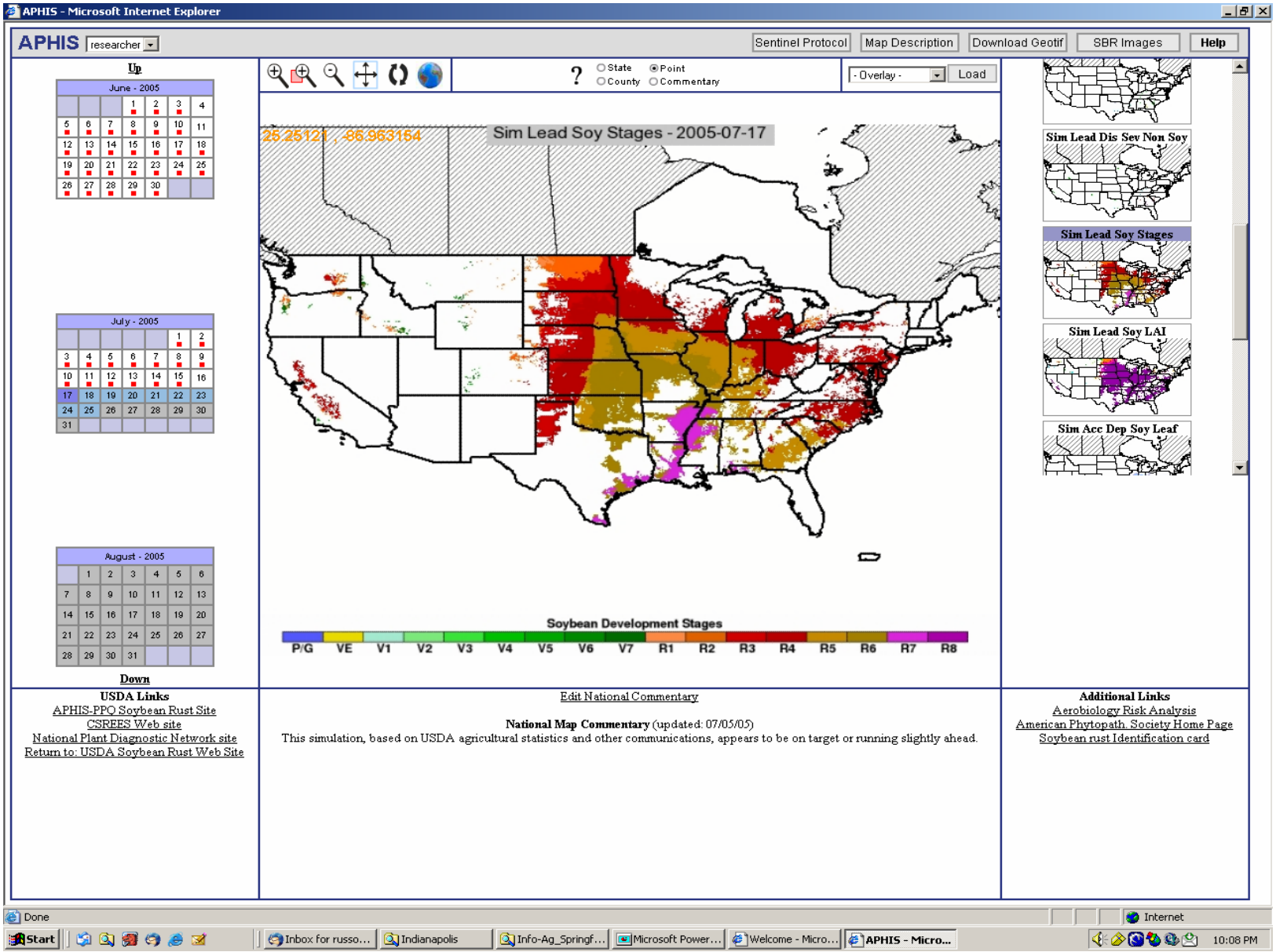
Researcher Web Site View



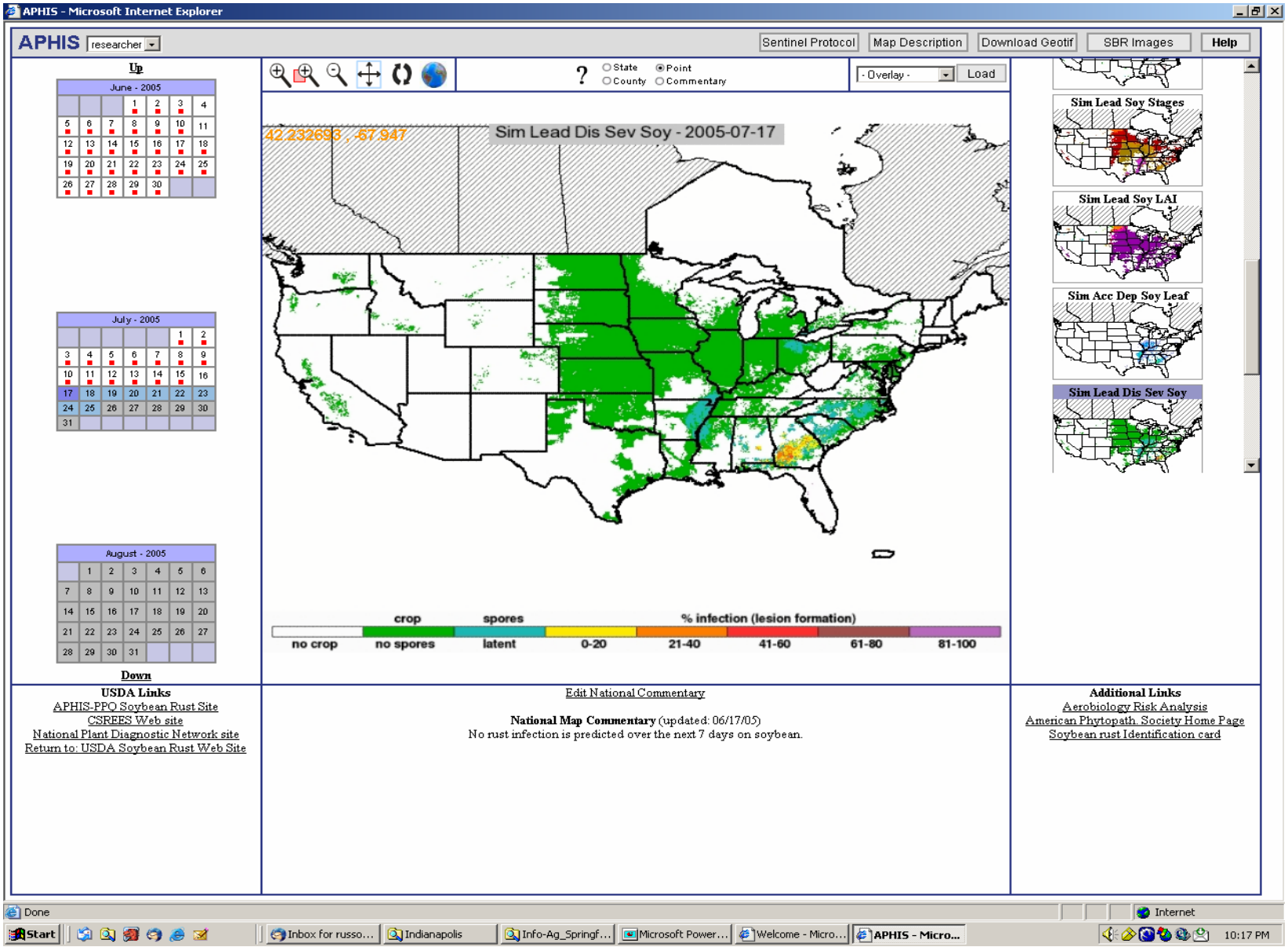
Researcher Web Site View



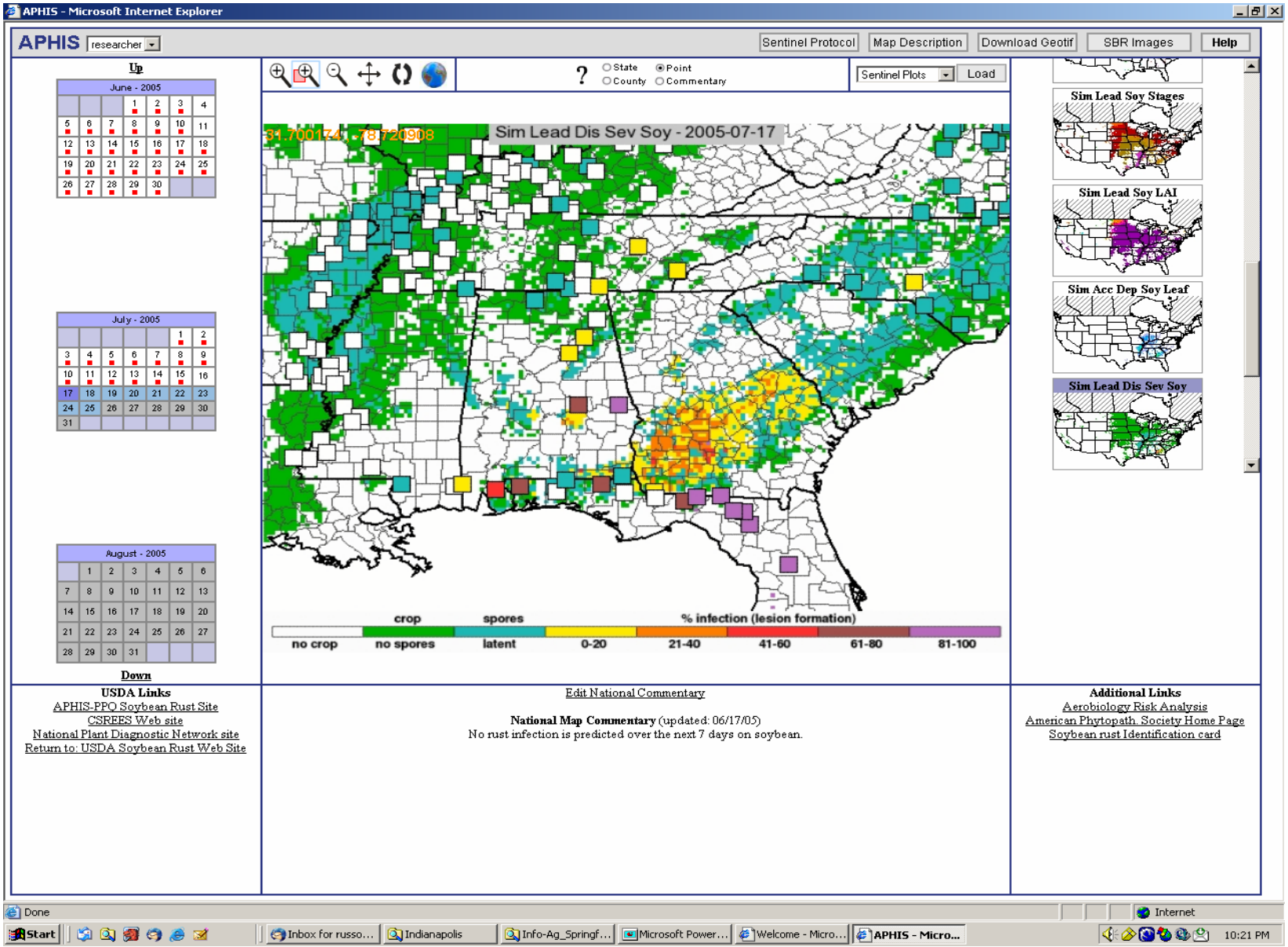
Researcher Web Site View



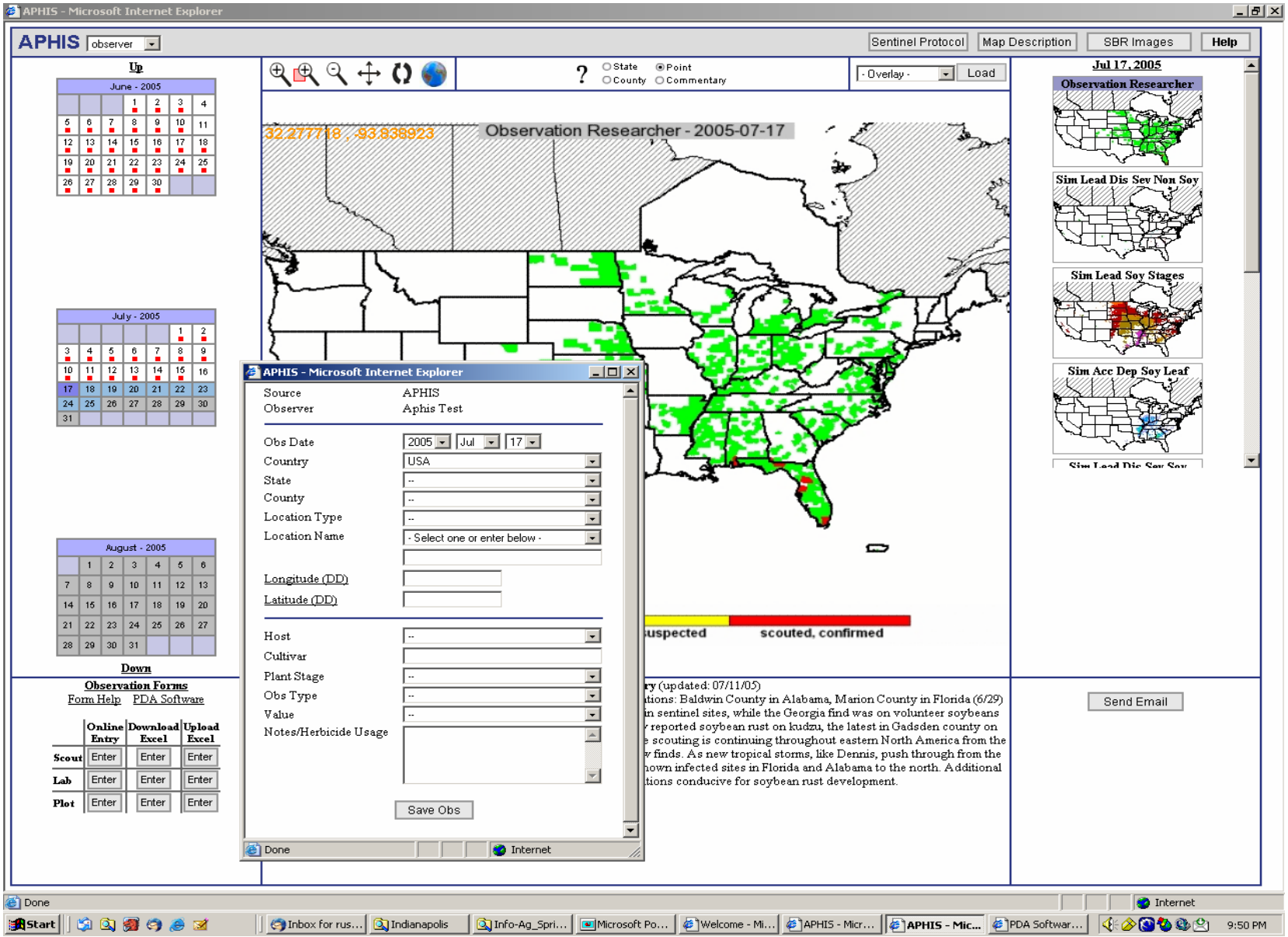
Researcher Web Site View



Researcher Web Site View



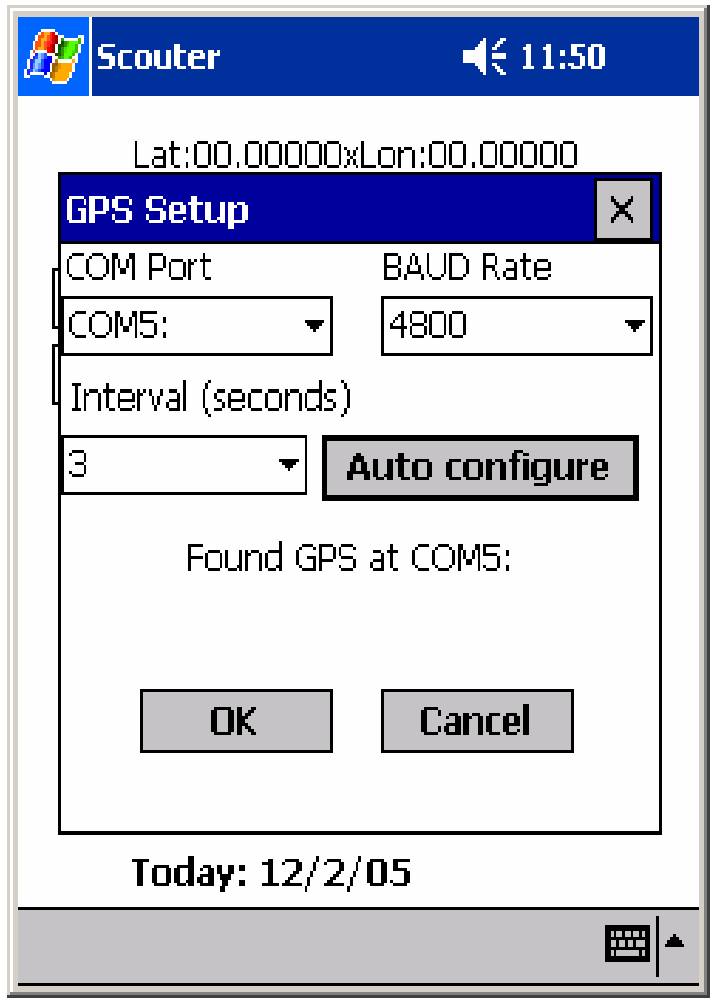
Observer Web Site View



Soybean Rust PDA

Setup GPS Signal

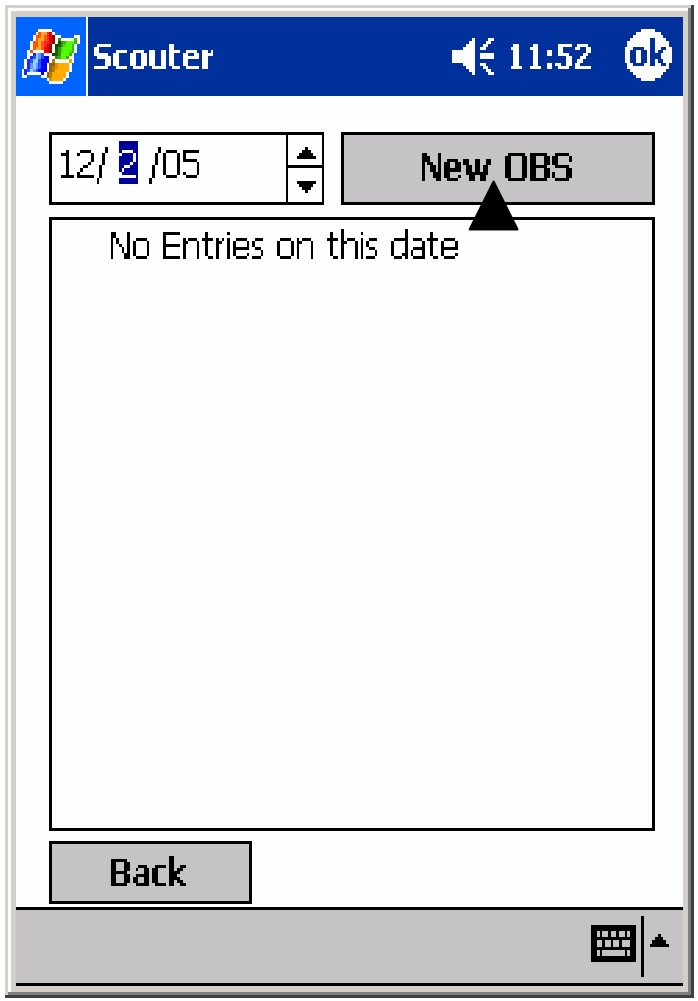
Display GPS Configuration



Soybean Rust PDA

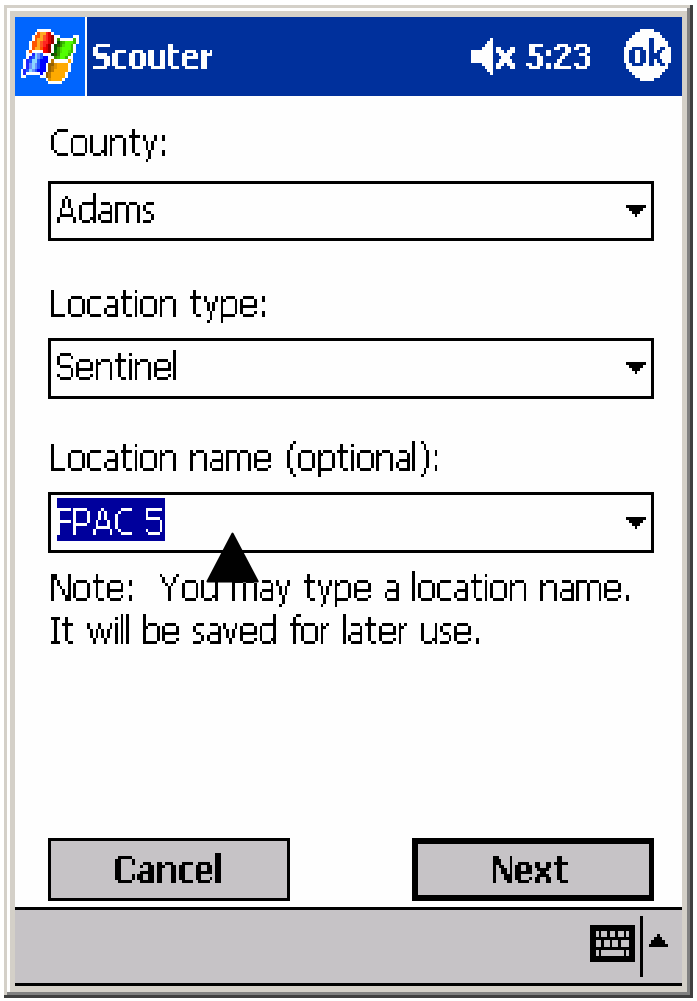
Click Calendar Date

Create New Observation

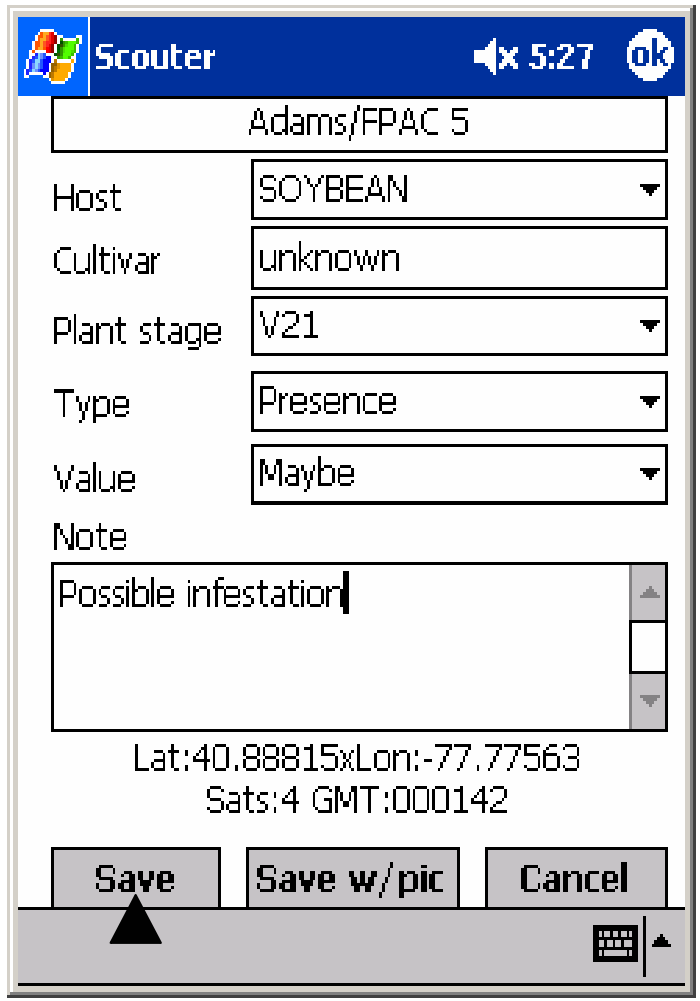


Soybean Rust PDA

Enter Location Information

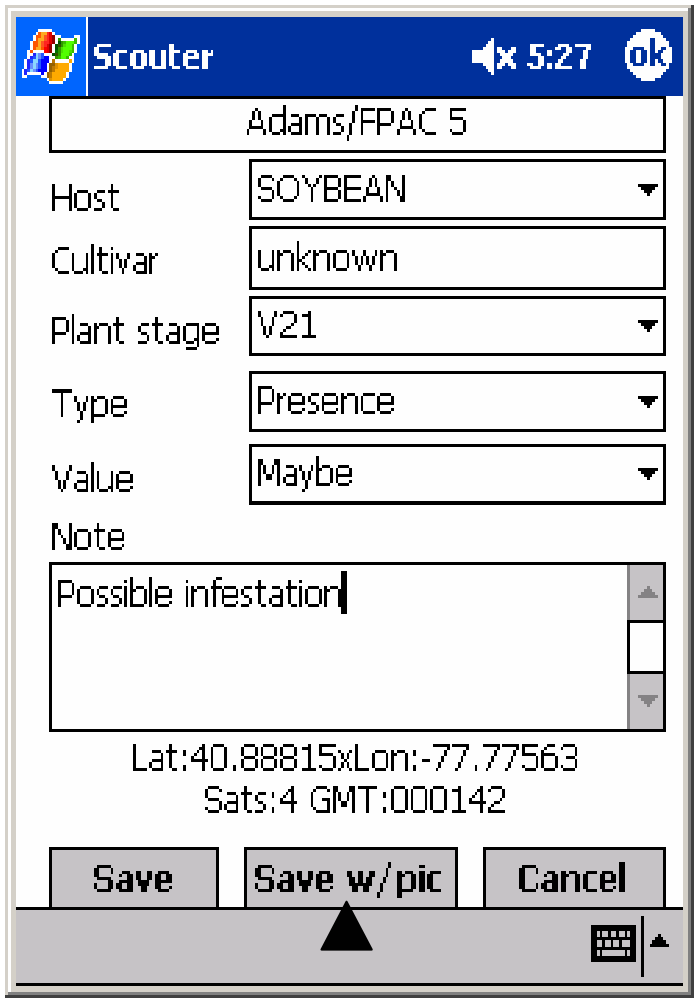


Enter Observations

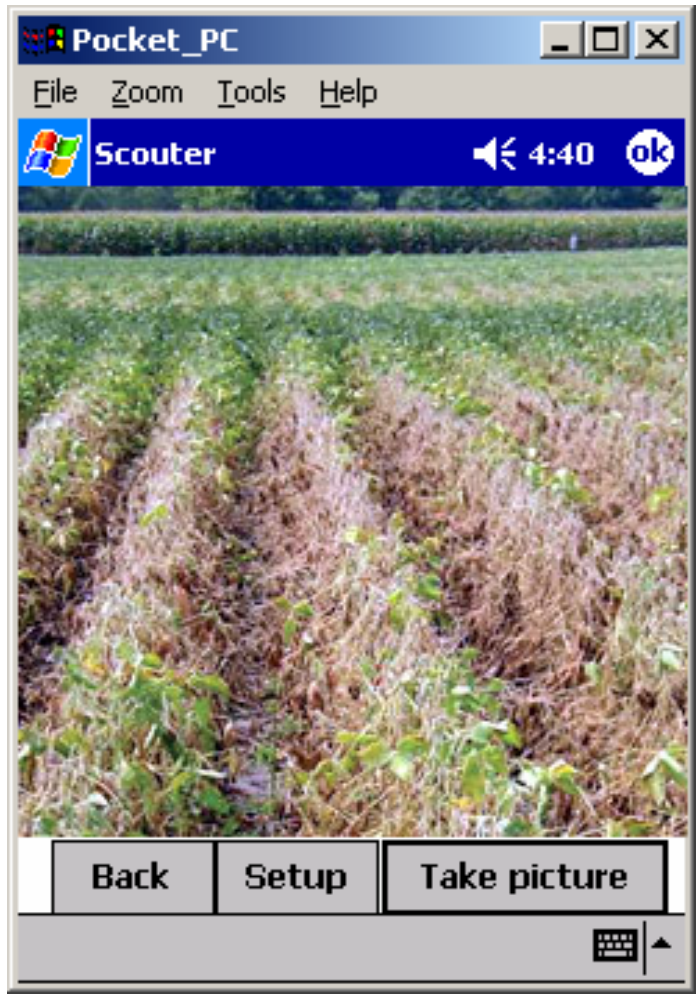


Soybean Rust PDA

Click Picture



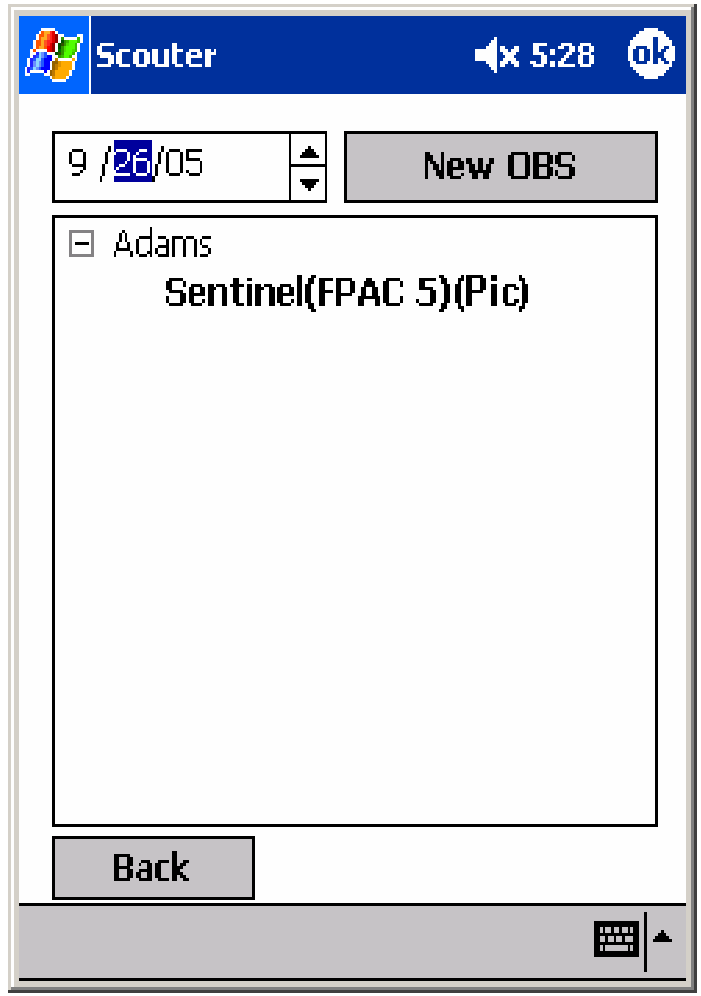
Display Picture



Soybean Rust PDA

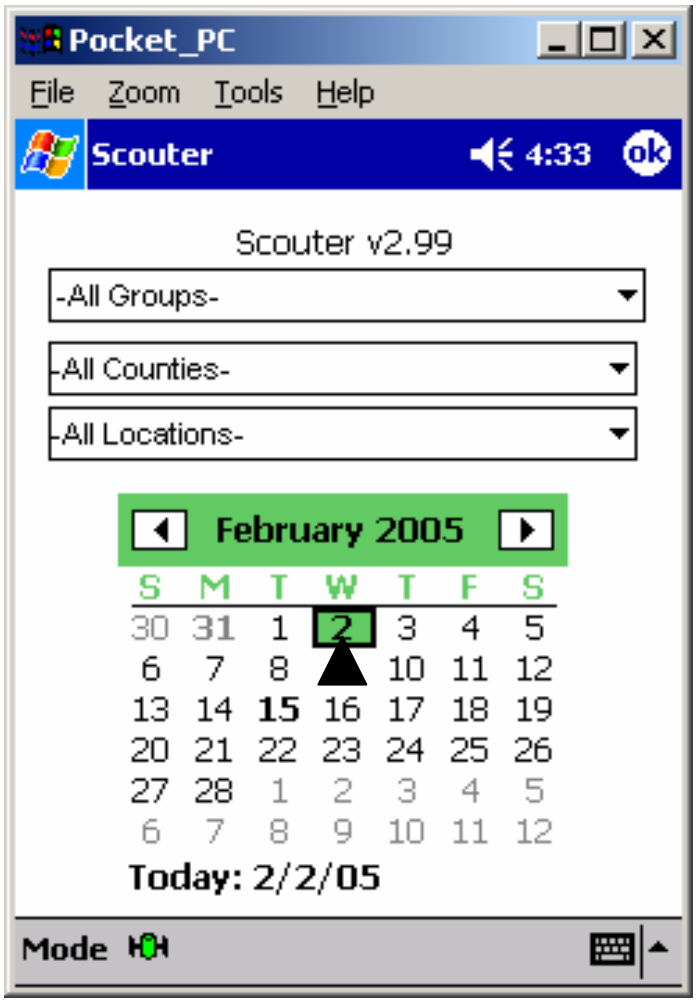
Click New Entry Calendar Date

Display New Observation



Soybean Rust PDA

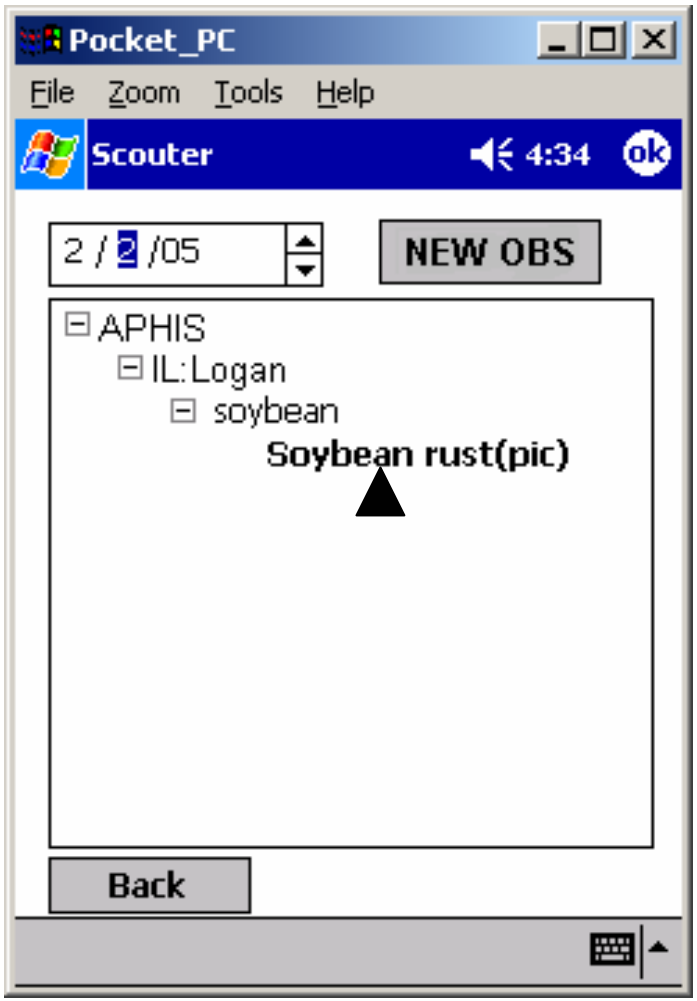
Click Calendar Date



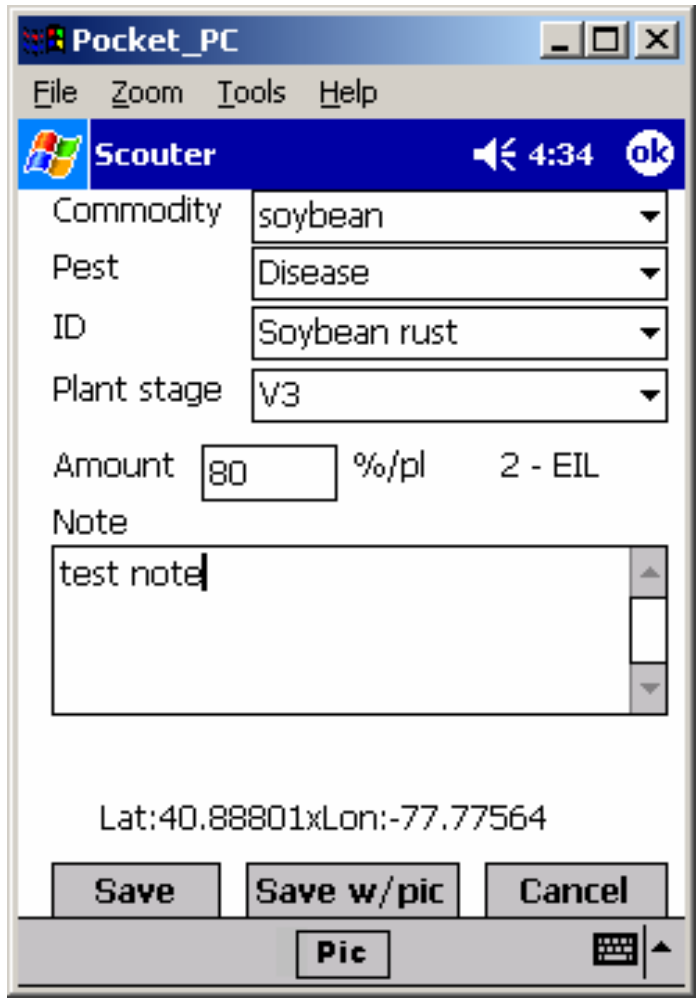
Display Existing Observations

Soybean Rust PDA

Click Observation

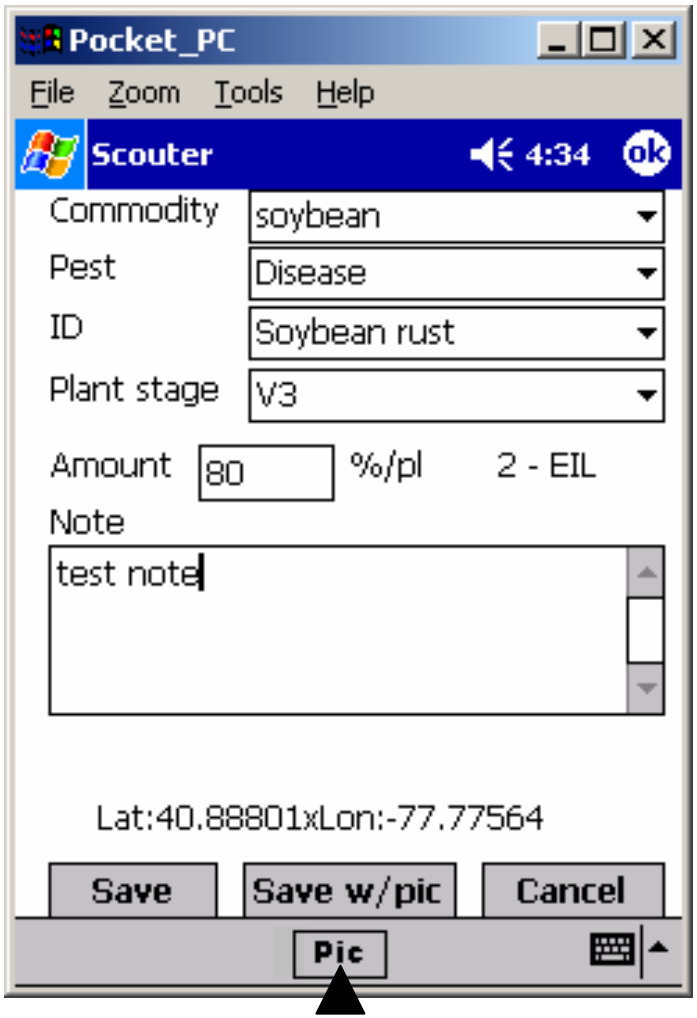


Display Data

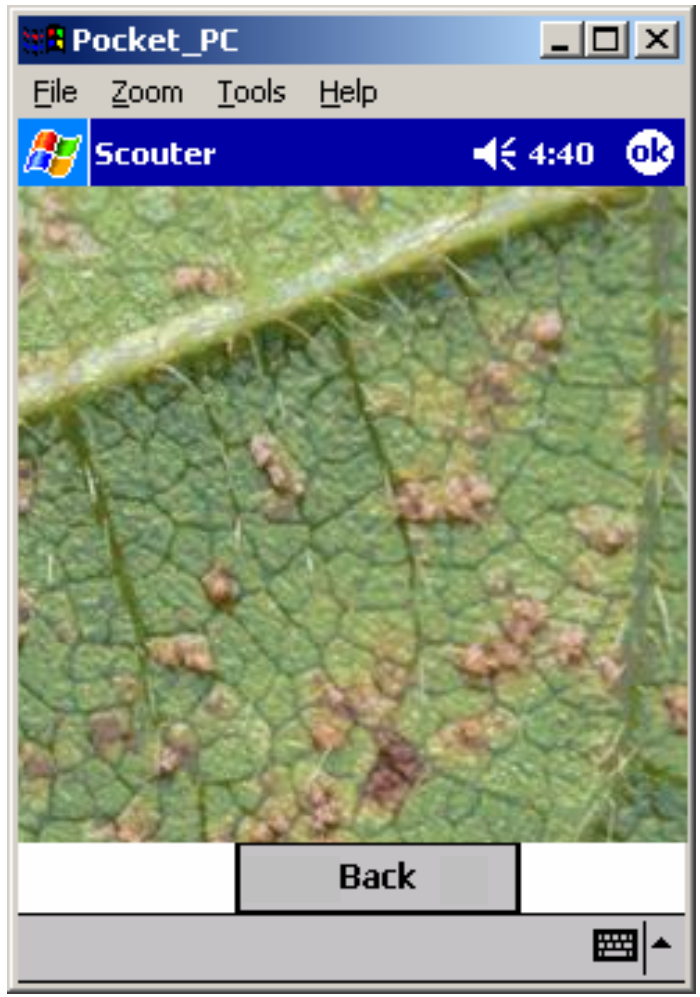


Soybean Rust PDA

Click Picture



Display Picture



Soybean Rust PDA

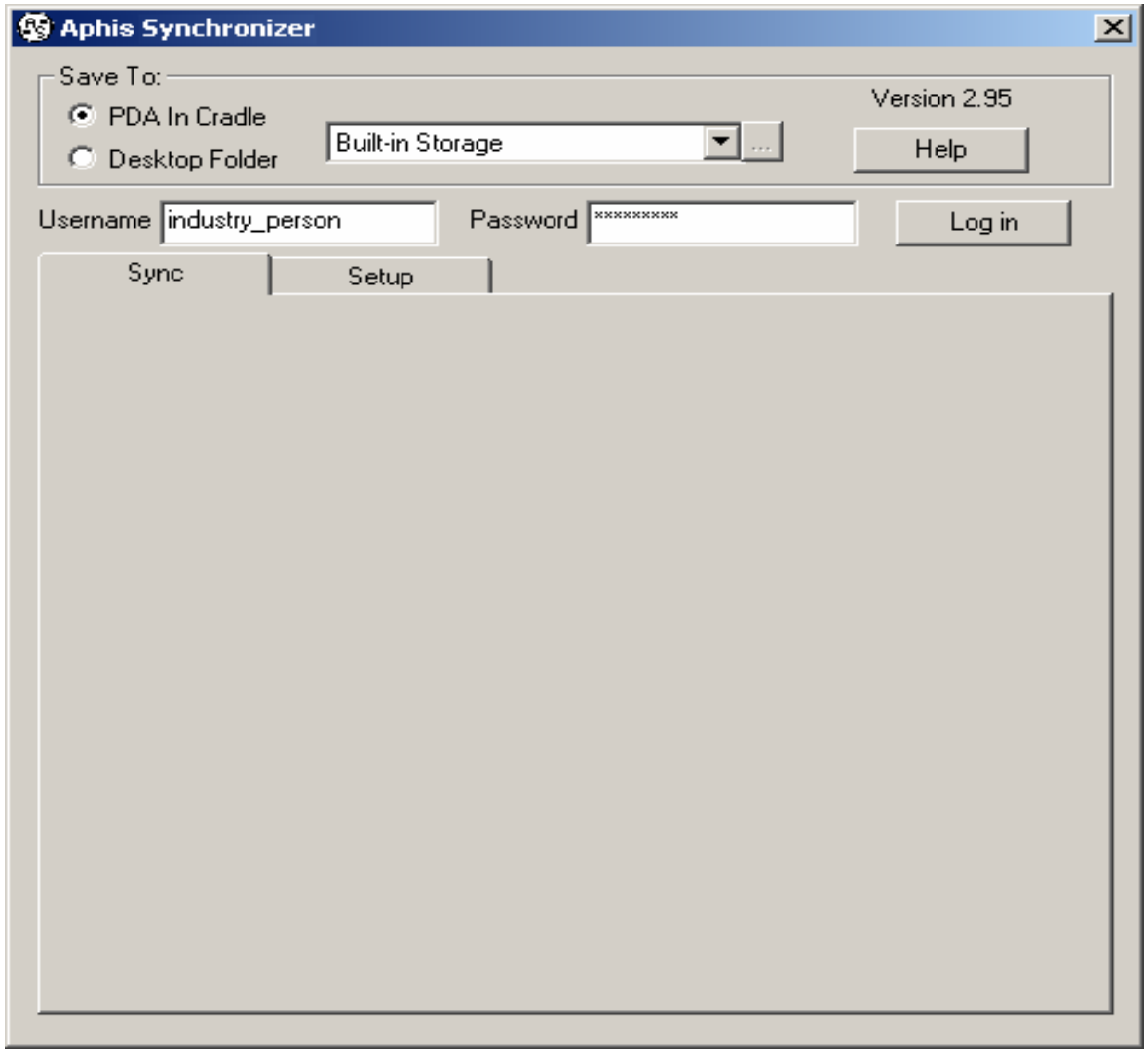
Insert PDA in Cradle

Or

Insert Memory Card in Slot

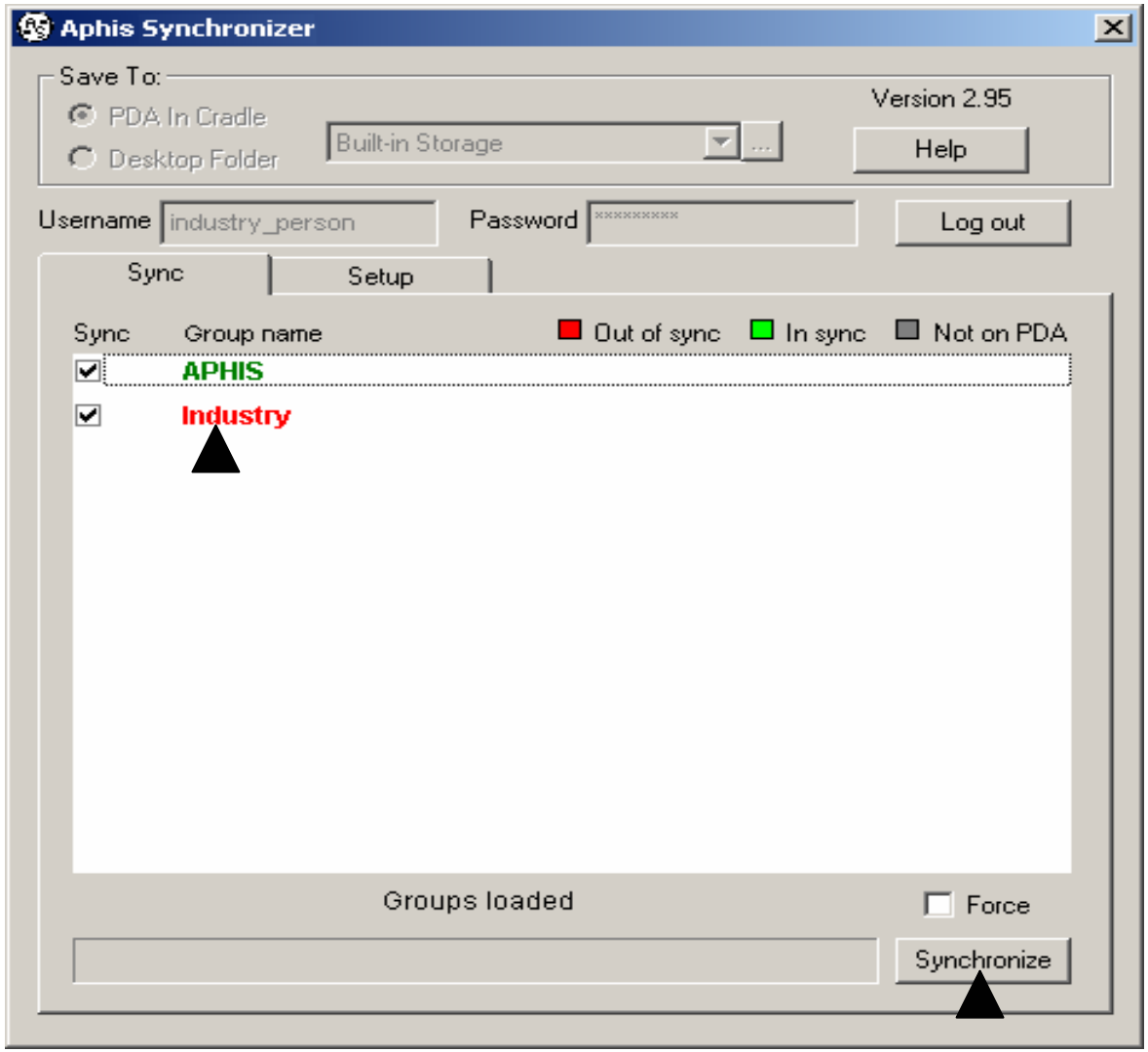
Soybean Rust PDA

Synchronizer Program Opens on Desktop



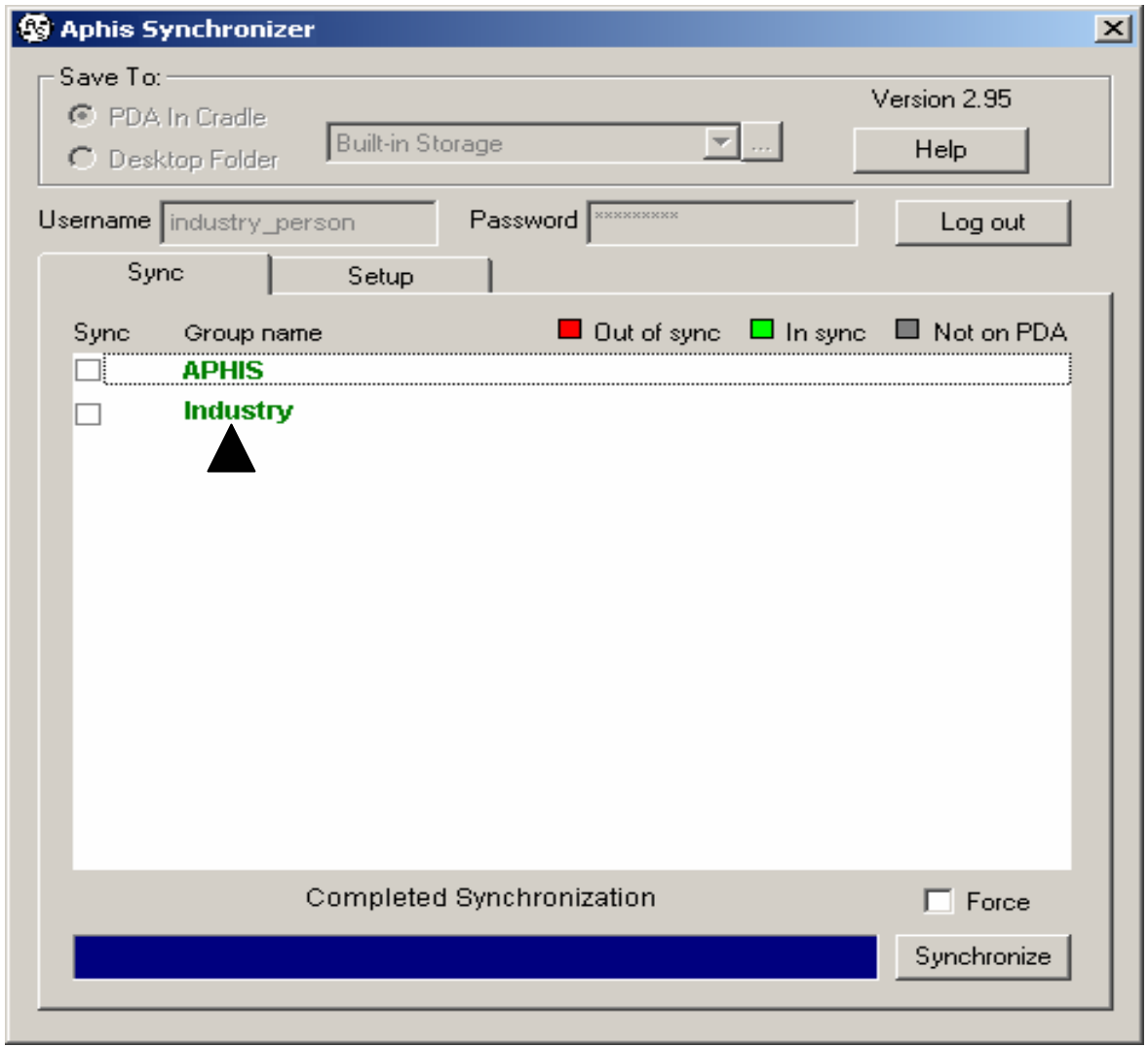
Soybean Rust PDA

Select Group & Synchronize

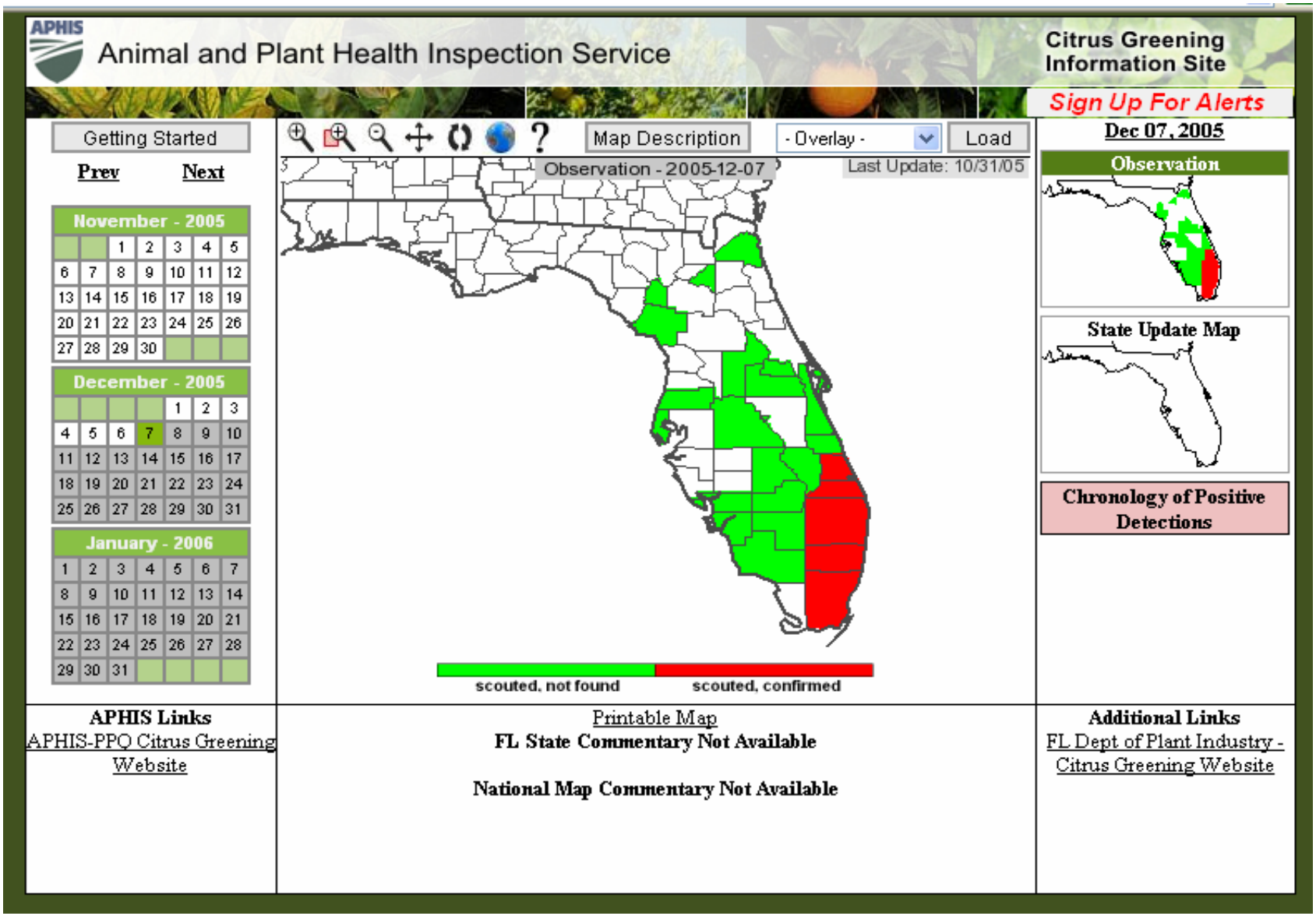


Soybean Rust PDA

PDA Synchronized & Observations Added to Web Site



USDA Citrus Greening Public Web Site



Thank you!

Questions?